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10/822,887

04/13/2004

Yoscf Akhtman

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EXAMINER

NGUYEN, LEON VIET Q

ART UNIT

PAPER NUMBER

2611

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/822,887

Applicant(s)

AKHTMAN, YOSEF

Examiner

Leon-Viet Q. Nguyen

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1, 3 and 8-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3 and 8-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/12/2004</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Priority*

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### *Information Disclosure Statement*

2. The information disclosure statement (IDS) submitted on 10/12/2004 was filed after the mailing date of 10/12/2004. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 1 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Atwater et al (US6175551).**

Re claim 1, Atwater discloses a method of reducing the peak-to-average power

ratio (PAPR) of a modulated baseband signal, wherein the baseband signal is constituted by a waveform function modulated by information-carrying symbols transmitted in parallel, the method comprising the steps of:

detecting peaks in the modulated baseband signal that exceed a threshold (peak detector 52 in fig. 4, col. 4 lines 59-62), and generating a pulse sequence signal therefrom (the output of peak detector 52 in fig. 4, col. 4 lines 63-66); and

applying a pulse sequence shaping to filter the pulse sequence signal (filter block 56 in fig. 4) for generating a peak-cancellation signal (the output of filter block 56 in fig. 4); wherein the pulse sequence shaping is designed such that its pass-band is limited to a frequency-domain gap between the edge of an information-carrying frequency bandwidth of the modulated baseband signal and an edge of a frequency band for the baseband signal defined by a spectral mask specifying a maximum tolerable out-of-band emission (although not explicitly disclosed, the pass band of the pulse shaping filter defined by the edges of an information-carrying frequency and a spectral mask is merely defining a filter).

Re claim 8, Atwater discloses a method further comprising subtracting (adder 64 in fig. 4, col. 5 lines 6-8) the peak-cancellation signal (the output of filter 56 in fig. 4) from the modulated baseband signal (the output of delay 66 in fig. 4) to produce a reduced-PAPR modulated baseband signal.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atwater et al (US6175551) and further in view of Wu et al (US20020172146).**

Re claim 3, Atwater teaches a method further comprising sampling the modulated baseband signal (IFFT block 28 in fig. 4, it is well-known in the art that an IFFT performs sampling) prior to the peak detecting step (fig. 4). However Atwater fails to teach oversampling of the signal. Wu teaches the use of an over-sampling IFFT in a transmission path (¶0082).

Therefore taking the combined teachings of Atwater and Wu as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the over-sampling IFFT into the method of Atwater. The motivation to combine Wu and Atwater would be to reduce the signal echo at the receiver (¶0082).

Re claim 9, the modified invention of Atwater teaches a method further comprising subtracting (adder 64 in fig. 4 of Atwater, col. 5 lines 6-8) the peak-cancellation signal (the output of filter 56 in fig. 4 of Atwater) from the modulated

baseband signal (the output of delay 66 in fig. 4 of Atwater) to produce a reduced-PAPR modulated baseband signal.

**3. Claims 10-13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atwater et al (US6175551) and further in view of Vannatta et al (US5930299).**

Re claim 10, Atwater teaches a transmitter comprising:

a baseband signal generator operable to generate a digital baseband signal from an input data stream (coding block 24 in fig. 4, col. 3 lines 56-60);

a digital-to-analogue converter operable to convert the digital baseband signal into an analogue baseband signal prior to output by a transmitter stage (digital-to-analog converter 36 prior to transmission block 38 in fig. 4);

a signal divider for splitting the oversampled digital baseband signal into first and second parts (the output of IFFT 28 is split in fig. 4);

a peak detector arranged to receive the first part of the oversampled digital baseband signal as input (peak detector 52 in fig. 4) and operable to output a pulse sequence signal containing a pulse for each peak in the oversampled digital baseband signal that exceeds a threshold level (col. 4 lines 61-66);

a pulse shaping filter operable to receive the pulse sequence signal (filter block 56 in fig. 4) and convert it into a filtered clipping signal (the output of filter block 56 in fig. 4) having a pass-band limited to a frequency-domain gap between an edge of an information-carrying frequency bandwidth of the modulated baseband signal and an edge of a frequency band for the baseband signal defined by a spectral mask specifying

a maximum tolerable out-of-band emission (the pass band of the pulse shaping filter defined by the edges of an information-carrying frequency and a spectral mask is merely defining a filter); and

a signal combiner operable (adder 64 in fig. 4) to subtract the filtered clipping signal from the second part of the oversampled digital baseband signal (col. 5 lines 6-8) so as to produce a digital baseband signal with reduced PAPR for input to the digital-to-analogue converter (col. 1 line 67 – col. 2 line 6).

However Atwater fails to teach an oversampling filter arranged between the baseband signal generator and digital-to-analogue converter operable to oversample the digital baseband signal to generate an oversampled digital baseband signal.

Vannatta teaches a transmitter (fig. 1) with an oversampling filter (FIR filter 164 in fig. 1, col. 3 lines 9-15) arranged between the baseband signal generator (encoder 120 in fig. 1) and digital-to-analog converter (DAC 168 in fig. 1).

Therefore taking the combined teachings of Atwater and Vannatta as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the filter of Vannatta into the transmitter of Atwater. The motivation to combine Vannatta and Atwater would be to reduce the peak-to-average power ratio of a modulated signal to allow an increase in power amplifier efficiency (col. 2 lines 14-16 and col. 2 lines 25-28).

Re claim 11, the modified invention of Atwater teaches a transmitter wherein the peak detector is further operable to output the pulse sequence signal comprising pulses having a magnitude corresponding to the amount by which each peak exceeds the threshold level (col. 4 lines 59-66 in Atwater).

Re claim 12, Atwater fails teaches a transmitter wherein the pulse shaping filter comprises an FIR filter. However Vannatta teaches using FIR pulse shaping filters (col 1 lines 24-25).

Therefore taking the combined teachings of Atwater and Vannatta as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the FIR filter of Vannatta into the transmitter of Atwater. The motivation to combine Vannatta and Atwater would be to limit interference with adjacent frequency channels (col. 1 lines 25-26).

Re claim 13, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 12.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leon-Viet Q. Nguyen whose telephone number is 571-270-1185. The examiner can normally be reached on monday-friday, alternate friday off, 7:30AM-5PM.



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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Leon-Viet Nguyen/

  
DAVID C. PAYNE  
SUPERVISORY PATENT EXAMINER